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Futuristic Aspects of Electrochemical Science and Technology

SYMPOSIUM AT CECRI

ndous advances in electro-al science and technology being n the recent past have opened up lines of attack to the solution of pressing problems as energy vation, materials conservation llution control. To take stock of dvances and to prepare a scenario ch electrochemistry will have to its role in keeping with the ing trends, were the objectives of a sium held on 11-12 October 1981 Central Electrochemical Research ute (CECRI), Karaikudi. ized by the Society for Advance- of Electrochemical Science and ology (SAEST) and cosponsor- mong others by CECRI, the sium held its deliberations in technical sessions besides a panel sion session.

e inaugural address by Prof. S. Hasan, CSIR's Vice President, set directions for future Indian rches in electrochemical science echnology. India cannot afford to permanently on imported tech- y, though imports needed for the ty of the nation could be allowed imited scale, said Prof. Hasan. The Vice President underscored the t need for CSIR and the industry ome together and chalk out rammes to solve the common ems arising from time to time. He emphasized the need for tapping sources of energy in view of the ating prices of petroleum products. ri D.C. Kothari, a leading in- ialist and president of SAEST, presided over the inaugural function.

Dr H.V.K. Udupa, CECRI's Director, delivered a keynote address on 'The status of electrochemical industries in India'.

In the first session on 'Electro-inorganic Processes', two papers were presented. One of them, by Shri R.V. Ramani (Mettur Chemicals and Industrial Corporation Limited, Mettur Dam), dealt with the developments of membrane cell technology and its suitability for adoption under Indian conditions. Shri S. Sampath (Titanium Equipment & Anode Manufacturing Co. Ltd, Madras) considered the future trends in electro-inorganic processes and pointed out the thrust areas of research with particular reference to India. These included fluorine and fluorine chemicals, halates and perhalates, among others.

In the session on 'Analytical Methods and Pollution Control', the health hazards and pollution problems stemming from occupational exposure to industrial fumes and chemicals were discussed by Dr C.R. Krishna Murti (Industrial Toxicology Research Centre, Lucknow). Dr S.R. Rajagopalan (National Aeronautical Laboratory, Bangalore) demonstrated the efficacy of modern electrochemical techniques in monitoring the ultra-low levels of heavy metals in solution. He envisaged the emergence of newer and simpler techniques based on electroanalytical methods for monitoring various other ions in the near future. Shri U.H. Narayanan (CSIO Regional Centre, Madras) surveyed the electronic instrumentation as applied to electrochemistry, touching upon bio-electrochemical applications also, with the use of microprocessors.

During the session on 'Electro-metallurgy', Shri A.K. Suri (Bhabha Atomic Research Centre, Bombay) presented data to show the viability of electrometallurgical routes to the production of rare and refractory metals like titanium and tantalum. He also dealt with the recovery and refining methods for various other metals such as molybdenum, vanadium and niobium on a laboratory scale which should form the basis for scale-up in the near future. Shri V. Aravamuthan (Retired Scientist of CECRI) envisaged the production of a number of metals and alloys by fused salt electrolysis employing simple nondiaphragm cells capable

New Name for CSSTD

The Centre for Study of Science, Technology and Development (CSSTD), New Delhi, has been renamed National Institute of Science, Technology and Development Studies. □

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of utilizing very high current densities and low inter-electrode distances. The recent trends in hydro-electro-metallurgy and the improvements being innovated for saving energy and reducing materials consumption were discussed by Shri R. Srinivasan of CECRI.

In the session on 'Electro-organic Chemicals' Prof. M.V. Bhatt (Indian Institute of Science, Bangalore) critically compared the electrolytic methods with the conventional methods of organic synthesis and mentioned the areas where the former could be advantageously used in future. Dr K.S.V. Santhanam (Tata Institute of Fundamental Research, Bombay) illustrated the scope of using electro-organic reactions at chemically modified electrodes and semiconductor electrodes for utilizing solar energy.

In the session on 'Electroplating and Metal Finishing', Dr R.P. Dambal (Indian Telephone Industries Ltd, Bangalore) dealt with treatment procedures, plating equipment, production techniques and the toxicity problems associated with this industry. Shri M.K. Totlani (BARC) critically reviewed the recent developments and future prospects of electro-forming and composite coating techniques. Shri B.A. Shenoi of CECRI highlighted the work carried out in his laboratory on electroplating and metal finishing with particular reference to anodizing as well as composite coatings.

In the session on 'Corrosion', Dr K. Elayaperumal (Corrosion and Metallurgical Consultancy Centre, Bombay) dealt with the problem of pitting and stress corrosion cracking of stainless steels, and stressed the need for developing newer inhibitors to achieve good inhibition efficiency without much increase in the total dissolved salts in cooling water systems. Methods available to control corrosion and the conditions in which they can mostly usefully be employed were discussed by Dr M.A. Sivasamban of the Regional Research Laboratory, Hyderabad. Dr K.S. Rajagopalan of CECRI dealt with the institute's current research programmes in both basic and applied aspects of corrosion, and indicated the futuristic aspects of corrosion science and anticorrosion technology.

Shri V.R. Subramanian (Indian Lead Zinc Information Centre, New Delhi) indicated, in the session devoted to 'Power Sources', the trends in developments in primary and secondary batteries with the particular use of zinc as one of the electrodes. Shri A.P. Desousa (Chloride India Ltd, Calcutta) discussed the possibility of using exotic high-energy density couples for future power sources in addition to high-energy density lead acid battery for electric vehicles. Various primary and secondary battery systems which can meet the present and future needs were surveyed by Dr P.B. Mathur of CECRI. A number of new battery systems such as fuel cells were also dealt with.

In the last session on 'Fundamental Electrochemistry and Solid State electrochemistry', the chairman Prof. K.S.G. Doss, founder-president of SAEST and a former Director of CECRI, visualized, in his opening remarks, the importance of lasers in electrochemical research.

Prof. S.K. Rangarajan (Indian Institute of Science, Bangalore) spoke of the role of modern electrochemical and optical techniques in advancing our knowledge on electrochemical interfaces. He predicted an exponential growth in the field of electrochemical science and technology. Prof. S. Aditya (Calcutta University) talked on the determination of absolute potential and free energy of solvation of ions and charge transfer process at electrochemical interfaces. Dr V.K. Venkatesan of CECRI spoke on the emerging area of electrochemical surface science. Conversion of light into useful fuels and electricity by using semiconductor electrodes, catalytic systems and chemically modified electrodes was discussed by Prof. P. Natarajan (Autonomous P.G. Centre, Trichy). Dr C.V. Suryanarayana of CECRI reviewed the futuristic trends in solid state electrochemistry with particular reference to electrocatalysis, solar cells, photoelectrochemical process, and phosphors.

A panel discussion on 'Coordination of R&D activities and industrial needs of the country' followed the technical sessions. □

RRL-Jorhat processes on speciality papers go into commercial production

Processes developed by the Regional Research Laboratory (RRL), Jorhat, for making direct-copy paper, correction paper and thermographic paper went into commercial production in September this year. RRL's scientists assisted the lincencee—Strobel Industries, Nizamabad, Andhra Pradesh—through all the stages of implementation of the project, including installation of machinery, setting up of the laboratory and commissioning and supervision of the commercial trial runs.

Direct-copy paper

This is a pressure-sensitive paper which eliminates the use of conventional carbon paper for making copies. The coloured transfer material is coated on the under side of the paper. Copies can be made by applying pressure on the coloured coated paper placed over a specially coated receptor surface. The process involves preparation of a coating mixture for both transfer and receptor coatings. The front face of the base paper is then coated with the transfer coating and its rear face with the coated paper is cut into desired sizes and made into rolls. Direct-copy paper finds use in making multiple-copy business forms, continuous stationery, air tickets, etc.; rolls of direct-copy paper are also used in telex machines, computers and other electronic data-processing machines.

Correction papers

These are used for correction of typographical errors in originals as well

ecialty papers— Cote-X, Duplica, Trugraph—manufactured by Strobel Industries, zamabad, on the basis of RRL-Jorhat know-how. The performance of the three specialty pers is reported to be comparable to, and in a number of cases better than, that of imported products

s carbon copies. To the typist the orrection paper provides an easy and ffortless means of getting neat and ean correction of errors. To make the orrection paper, the base paper or lastic is coated with a coating mixture repared for the purpose. On drying, the aper is cut into small sheets and acked.

Thermographic paper

A specialty paper which is heat- and ressure-sensitive, it is used in data-ecording instruments like electrocar-liographs and seismographs. The rocess consists in coating a coloured ase paper with a coating comprising eat-fusible non-transparent pigment articles along with a binder. The oating is applied on one side of the base aper, which on drying gives thermo-graphic paper. For making ECG paper, a square graph is printed over the white hermographic coating and made into olls.

The performance and properties of he three specialty papers manufactured y Strobel Industries have been found to e satisfactory and comparable to, and, n a number of cases, better than those of imported products available in the market.

The firm has already entered the domestic market for these papers with brand names like Duplica (direct-copy paper), Cote-X (correction paper) and Trugraph (thermographic paper for electrocardiographs). The firm also plans to introduce its products in foreign markets. It has in hand an export order from Mascat, Oman, for 1000 rolls of direct-copy paper. □

Industry sponsors project on maleic anhydride process development at NCL

A project for the development of a process for production of maleic anhydride from crotonaldehyde has been sponsored at the National Chemical Laboratory (NCL), Pune, by Deccan Sugar Institute, Pune.

Maleic anhydride, which finds use in the manufacture of dye intermediates, pharmaceuticals and agricultural products, and several copolymers and resins and also in the diene synthesis, is conventionally prepared by benzene oxidation. It can also be obtained by partial vapour-phase catalytic oxidation of crotonaldehyde—an attractive, alternative route. Crotonaldehyde is being produced by some sugar industries in the country.

The demand for maleic anhydride in India is much in excess of indigenous production: large quantities of the chemical (over 1000 tonnes per annum in the past few years) are being imported to meet the domestic demand. □

Cell for assistance to small-scale chemical industry at NCL

A cell for rendering assistance to small-scale chemical manufacturers has been set up at the National Chemical Laboratory (NCL), Pune. The cell has the following objectives:

- To render assistance/advice/consultancy in solving in-plant technological problems
- To assist in developing know-how by providing bench-scale and pilot plant facilities
- To assist in assessing the know-how from technological point of view
- To maintain a data bank and liaison with the industry
- To monitor the assistance rendered
- To organize short-term courses, lectures and seminars for their benefit.

The cell, consisting of a few NCL scientists and experts in various branches of chemistry who would voluntarily undertake this work, will operate under the supervision of Dr S.M. Abhyankar. □

Low-cost water-seal latrines for urban communities

Following its study of the various aspects of designs for low-cost water-seal latrines under a UNDP global project sponsored by the World Bank, the Central Building Research Institute, Roorkee, has submitted a report to the sponsor. The report covers design aspects, viz. size of latrine, size of leaching pit for different users and for different time periods; its distance from the existing structures; proper fixing of hand-flushed water-seal latrines; and

use of alternative materials both for leaching pit and for construction of superstructure. Besides various alternatives for construction of latrines, the report furnishes 16 designs for the leaching pit and four for pit covers under different conditions and locations. □

Design of chimneys for domestic kitchens

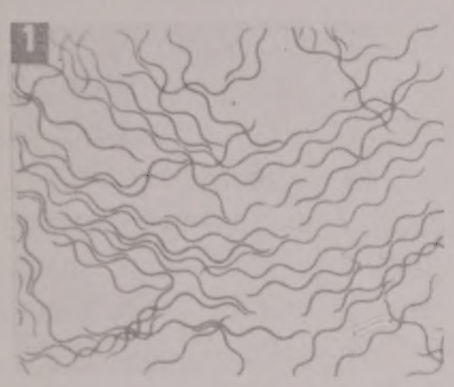
Following its studies on the design of kitchen chimneys for single-storey houses the Central Building Research Institute, Roorkee, has brought out a technical note on 'Design of chimneys for domestic kitchens'. The distinctive features of the chimney with optimized design are ease of construction and cleaning, absence of riverse flow of smoke, total extraction of smoke, and full protection against rain. Such chimneys have been installed in a few houses, where cow dung and firewood are used as fuel, and are functioning satisfactorily.

Investigations on chimneys for multistorey houses have also been undertaken and a chimney of appropriate design has been fabricated and installed at a mock-up building for preliminary trials. The results are quite encouraging. □

Sewage-grown alga for animal feed

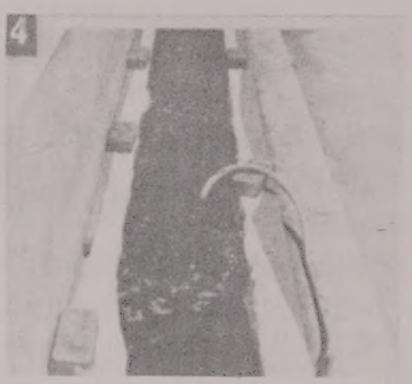
Biotechnology of cultivation in sewage of *Spirulina platensis*, an underexploited protein-rich blue-green alga, for use as poultry feed is at an advanced stage of development at the National Botanical Research Institute (NBRI), Lucknow. Pilot-scale trials in an open ponding system with an exposed surface area of 4.50 m^2 are under way.

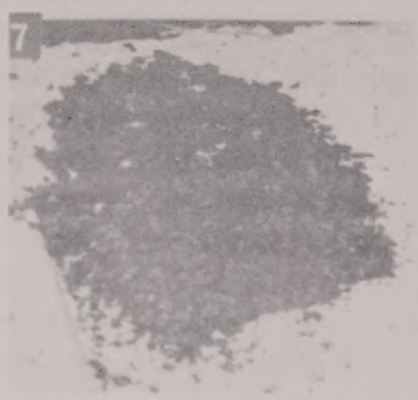
The alga grows abundantly in nature in salty lakes and ponds in central Africa. After extensive bench and field experiments, it has been possible adapt *Spirulina* to a radically differ substrate of raw sewage fortified w sodium bicarbonate and suitable rogen source. Seven distinct strains the alga, adapted to different nitrog sources, have been raised. Based on natural ecology, this brackish-wa African alga has been developed bloom in municipal sewage, and simple open-air method for producing in bulk has been standardized. present, the method is being tried in 60,000-litre sewage pond system, su plemented with sodium bicarbonate a sodium nitrate, and utilizing sol energy for algal production. For t past one year, the average yield in t cultivation plant has been 6.5 g per s meter per day of dry *Spiruli* containing about 55% crude protei The amino acid profile has be examined, and the sewage-grown al has been tested for the presence pathogenic bacteria and amoebae. T



Cultivation of Spirulina platensis, a protein-rich alga in sewage for animal feed

1. Photomicrograph of *S. platensis*
2. *Spirulina* cultivation sewage ponds
3. Manual agitation of the culture
4. Cloth filtration
5. Collecting algal slurry
6. Sun-drying
7. Dried *Spirulina* biomass
8. Preparing the feed mix
9. Feeding white Leghorn chicks





erial has proved to be completely oxic.

ne major steps in the cultivation of *olatensis* are: preparation of in- um, mass outdoor cultivation in low ponds, simple cloth filtration, sun-drying. The dried algal powder be used as an ingredient of poultry .

he effluent from the ponds is asionally led into a 260 m^2 fish pond, ch is attached to the algal ivation unit for rearing fish and also arry out algal feeding experiments n freshwater carps. The reclaimed er from the fish tank is used for gation.

ewage-grown *Spirulina* has been ed as a high-protein, high-carotene itive for chicken feed with very arding results. Extensive feeding ls have been planned in col- oration with the Uttar Pradesh ernment's Ganjaria Poultry Farm at cknow.

n addition, the U.P. Jal Nigam has eady started biogas production from age sludge in a pilot plant very near algal ponds. The effluent from this nt is utilized for algal cultivation and o for irrigation. □

Alpha-foetal protein for diagnosis

simple method of isolating alpha- tal protein (AFP) from human cord um has been developed by the ntral Drug Research Institute, cknow. Monospecific antibodies sed against it in rabbits can be used measuring AFP levels of up to 2- g/ml. A high level of AFP in sera of gnant mothers or in amniotic fluid icates foetal abnormalities (neural e defect, spina bifida, etc.) as also patocellular carcinoma and germ cell atocarcinoma. Early detection of P can help in taking a decision about dical termination of pregnancy. In a of adults, a high AFP level is an icator of hepatocellular carcinoma d germ cell teratocarcinoma. □

Seed and spermoderm morphology of economically useful Leguminosae species

Seed and spermoderm morphology of 66 species of economically useful Leguminosae has been studied with the help of light and scanning electron microscope (SEM) by Shri G.D. Bagchi of the Central Institute of Medicinal & Aromatic Plants, Lucknow.

The spermoderm ornamentation is a stable and characteristic feature of seeds. It is of importance in taxonomy, particularly in the identification of doubtful taxa as an additional tool. The most dependable region for scanning electron microphotography has been found to be the sides of the seeds, lying below the hilum.

Spermoderm ornamentation, which has been studied by SEM, is the ornamentation present on the seed-coat surface of fully grown, dry seeds. The cuticle, which is the outermost layer of the seed-coat, is the layer which has these ornamentations. But sometimes the deposition on the cuticle and underlying cells of palisade layer also plays an important role in this respect. The most common ornamentation on the spermoderm surface of Leguminosae is of the rugose type. This ornamentation occurs in about 38% of seeds; while tuberculate, reticulate and pitted patterns occur in 24%, 17% and 12% respectively of the seeds investigated. Only a few members have smooth, striated and undulated spermoderm ornamentations; however, they are rather low, only in about 5% and 3% cases respectively. Tuberculate pattern is perhaps the most advanced type of ornamentation because it is usually found on the seeds of herbaceous Papilionatae. Since the rugose pattern is commonly found on the seeds of Caesalpinioideae and Mimosoideae, it is interesting to note that when this kind of pattern occurs in the papilionaceous seeds, they invariably belong to the plants which are trees or shrubs; this fact suggests that this character is probably a primitive one. However, reticulate and pitted patterns are found to be of intermediate type, while smooth and undulated patterns are of rare occurrence. However, the spermoderm ornamentation is characteristic of particular species. Hence its great importance for specific diagnosis.

It has been observed that gross spermoderm ornamentation does not change under different geographical and climatic conditions but the amount of depositions may vary. Two types of depositions have been found on the spermoderm surface of Leguminosae. The first is of waxy nature and it appears white when observed under SEM. This deposition is found mostly on the papilionaceous seeds. The second is smooth, covering the seed surface uniformly, and appears grey under SEM. This deposition is common in all the three subfamilies of Leguminosae. Seeds with this deposition are usually impermeable to water and do not germinate easily, unless the deposition is removed partially or completely. It has been found that long-day species of Leguminosae usually possess this deposition, which is laid down during the maturation of seed from the inner side of the pod and this may be mainly responsible for seed dormacy. However, wax depositions are usually found in patches; thus they do not hinder absorption of water by the seeds.

Further, it has been found that in a majority of papilionaceous seeds, the hilum functions as a hygroscopic valve. At a relatively low humidity the fissure in the hilum opens, permitting the seed to dry out. On the other hand, when the relative humidity is high, the fissure closes, checking absorption of moisture by the seed. It has been noticed that desiccation brought about by loss of water through the hilum increases the duration of the impermeable condition of the seed.

The SEM studies have shown how they can aid in the identification of living and fossil seeds, in tracing out the phylogenetic relationships of doubtful taxa, and also in finding out the cause of hardness of the seeds.

Shri Bagchi, who carried out the studies under the guidance of Prof. B.S. Trivedi, head, Botany Department, Lucknow University, Lucknow, was awarded Ph.D. degree in 1981 by this university. □

Chemical Studies of Steroidal Saponins

Diosgenin, which is widely used in the production of corticosteroids, sex hormones and oral contraceptives, is known to occur as glycosides in the tubers of *Paris polyphylla* (Liliaceae). Since little was known about the saponins of the plant, Shri Sheo Bux Singh, a research fellow at the Central Institute of Medicinal & Aromatic Plants, Lucknow, has attempted isolation and characterization of the saponins.

Methanolic extract of the tubers yielded six new saponins along with a known one. Using the latest field desorption mass spectrometry technique the research fellow determined the molecular weights as well as the precise fragmentation patterns of the saponins. Because of the polar character of the compounds, repeated column chromatography technique was used to isolate them. The identification of sugars present in saponins as also the determination of sequence and mode of linkage present great difficulties. These problems were overcome through chemical reactions like partial hydrolysis, periodate oxidation, Smith degradation, acetylation and exhaustive methylation and application of ^{1}H-NMR. The structures of these saponins have been assigned as: (1) diosgenin-3-O-β-D-glucopyranoside; (2) diosgenin-3-O-α-L-rhamnopyranosyl-(1→3)-β-D-glucopyranoside, (3) diosgenin-3-O-α-L-rhamnopyranosyl-(1→3)-[α-L-arabinofuranosyl-(1→4)]-β-D-glucopyranoside, (4) diosgenin-3-O-α-L-rhamnopyranosyl-(1→3)-[α-L-rhamnopyranosyl-(1→2)-α-L-rhamnopyranosyl-(1→4)]-β-D-glucopyranoside, (5) diosgenin-3-O-α-L-rhamnopyranosyl-(1→4) – [α-L-rhamnopyranosyl-(1→3)] – [β-D-glucopyranosyl-(1→2)}-α-L-rhamnopyranoside, (6) 3-O-{α-L-rhamnopyranosyl (1→3)-[α-L-arabinofuranosyl-(1→4)]-β-D-glucopyranosyl}-26-O-[β-D-glucopyranosyl]-(25 *R*)-furost-5-en-3β,ↄ 22α, 26-triol, and (7) 22α-methoxy derivative of (6). All the aforesaid compounds had glucose except 5 which had rhamnose linked to the C-3 of diosgenin. This is very significant inasmuch as there could be differences in sugar metabolism in the plant and in biological activity. The configuration and conformation were deduced by ^{1}H-NMR spectroscopic methods. All the compounds had $^4C_1$ conformation of L-rhamnose, which is very uncommon in L-sugars.

A very significant finding is the isolation of a novel phytoecdysone (2α, 3β, 14α, 20(*R*), 22(*R*), 25-hexahydroxy-5β-cholest-7-en-6-one), which has a diverse stereochemistry at C-2 and C-3. As phytoecdysones are a group of compounds which are responsible for moulting in insects, the compound isolated may possess a significant activity.

A detailed investigation of the saponins of seeds of *Costus speciosus* (Costaceae) was made. Ten saponins were isolated and structures elucidated by methods followed in the case of *P. polyphylla*. These were: β-sitosterol-3-O-β-D-glucopyranoside, prosapogenin-B of dioscin, prosapogenin-A of dioscin, dioscin, gracillin, 3-O-[α-L-rhamnopyranosyl-(1→2)-β-D-glucopyranosyl]-26-O-[β-D-glucopyranosyl]-(25 *R*)-22α-methoxyfurost-5-en-3β, ↄ 26-diol, methylprotodioscin, protodioscin, 3-O-{β-D-glucopyranosyl-(1→2)-α-L-rhamnopyranosyl – (1→2) – [α-L-rhamnopyranosyl – (1→4)]-β-D-glucopyranosyl}-26-O-[β-D-glucopyranosyl]-(25 *R*)-furost-5-en-3β, 22α, 26-triol, and its 22α-methoxy derivative. Most of the saponins have been reported for the first time from the Costaceae family, and the last two furostanol saponins are new examples to the literature.

Shri Singh, who carried out the work under the guidance of Dr R.S. Thakur, was awarded Ph.D. degree by the Avadh University, Faizabad, for his thesis based on the studies. □

Conference Briefs

CCIR Study Group Mee

Dr B.S. Mathur of the Na Physical Laboratory, New participated in the final meeting International Radio Consul Committee (CCIR) Study Group Standard Frequencies and Time S held at Geneva, Switzerland, fron 16 September 1981. This study gr the top policy-making and orga body in the field of time and frequ Documents on work done in Inc precise time transfers via very frequency and satellites were pres by Dr Mathur, who represented In the one-man delegation of the Mi of Communications. These works appreciated by the participating ac istrations and were accepted inclusion in the final CCIR Group VII document. Indian effo providing time services via the I domestic satellite INSAT, in the future, were noted with a great de interest, observes Dr Mathur.

The NPL scientist also reports frequent references were made, d the meeting, to India's substa contribution in the field of time frequency and the international posium on Time and Frequency he NPL, New Delhi, in February This symposium surfaced va problems in the field of time frequency relating to developing co ries and led to interaction betwee developed and developing centre view of the predominantly attendance in the study group by developed world, Dr Mathur's poi to the time and frequency needs requirements of the developing co ries and the ways and means to these was a substantial and signif contribution to the meeting, as vie by other members.

In continuation of his visit to Ger Dr Mathur presented, on invitatio poster at the third symposium Frequency Standards and Metro held at Aussois, France, 12-15 Oct 1981. This symposium, which is

n five years, invites only the most and significant contributions. chievements of NPL, New Delhi, ne last few years were appreciated delegates, observes Dr Mathur. Mathur also visited, on invitation, atoire de l'Horloge Atomique, rsite de Paris, Orsay, France (17-ep.); Bureau International de re, Paris, France (23-25 Sep.); sikalisch-Technische esanstalt, Braunschweig, FRG (28 9 Oct.); and Instituto rotechnico Nazionale, Torino, (16-20 Oct.).

ring his visit to the above atories and institutions, the CSIR tist had detailed discussions with s of laboratories and other tists on the work being done at places and apprised them of the ities at NPL. Not only was the n contribution to the field of time frequency greatly appreciated but iderable interest was shown in ediate joint collaboration pro-mes, reports the NPL scientist. □

Deputation Briefs

cipating in the meeting of the hemical Society (of Great Britain) ancaster, 16-17 September 1981, Dr . Bhargava, Director, Centre for ular and Molecular Biology, erabad, delivered a special invited re on 'Four new unusual proteins bovine spinal fluid'. The meeting organized in collaboration with the ety of Biological Chemists (India), h had sent six representatives one of m was Dr Bhargava himself. Dr rgava also delivered invited lectures ne National Institute of Medical earch and Guy's Hospital Medical ol, London, on (i) A new type of ein inhibitor of transport from rat : its isolation, properties and ible significance, and (ii) Does lation of cell division and malignant sformation involve regulation of the ke of the essential nutrients?

arlier, Dr Bhargava visited entrum, University of Basel, Basel, Basel Institute of Immunology in Switzerland, and the Netherlands Cancer Institute, Amsterdam, to deliver lectures. He also availed himself of the opportunity to discuss with experts research problems in cellular and molecular biology. On his return journey, he visited Max-Planck Institute for Biophysikalische Chemie of Gottingen at Frankfurt. □

PERSONNEL NEWS

Shri S.K. Majumder
Acting Director of CFTRI

Shri S.K. Majumder, Scientist F, assumed charge as Acting Director of the Central Food Technological Research Institute (CFTRI), Mysore, on 1 October 1981 consequent on Shri C.P. Natarajan's retirement [*CN*, 31 (1981), 152].

Shri Majumder, who was till now project coordinator of the Discipline of Infestation Control and Pesticides, is well known for his contributions in storage techniques for food grains and post-harvest technology. □

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Dr B.N. Desai, Scientist in charge, National Institute of Oceanography's regional centre at Bombay, relinquished charge of office on 30 October 1981 to take over as Director, Department of Ocean Development, Cabinet Secretariat, New Delhi. Dr S.A.H. Abidi has taken charge as Scientist in charge of the NIO's regional centre. □

Appointments|Promotions

Shri A.K. Dutta, Senior Finance & Accounts Officer, Central Glass & Ceramic Research Institute, Calcutta, has been appointed, on promotion, Deputy Chief (Finance), CSIR Headquarters, New Delhi, with effect from 17 October 1981. □

Honours|Awards

Dr Nitya Nand

Dr Nitya Nand, Director, Central Drug Research Institute, Lucknow, has been named recipient of the Vishwakarma Medal for 1982 for his outstanding contributions to the development of indigenous pharmaceutical industry. The award, administered by the Indian National Science Academy, is given to 'eminent scientists, technologists or others whose discovery or invention has led to the starting of a new industry in India, or to a significant improvement

of an existing process resulting in a cheaper or better product'. The source of this award, made every three years, is the income from a fund (Rs 33,000) placed at the disposal of INSA by Dr P.B. Sarkar, FNA. □

* * *

Dr K.G. Das of the National Chemical Laboratory, Pune, has been nominated regional editor for southern Asia and member of the editorial advisory board of *Mass Spectrometry Reviews*.

* * *

Dr R.A. Mashelkar of the National Chemical Laboratory, Pune, has been elected an associate member of the International Committee on Rheology.

* * *

Dr Rajendra Kumar of the National Metallurgical Laboratory, Jamshedpur, has been invited to serve on the international advisory editorial board of *High Temperature Technology*, a journal which will be published by the IPC Science and Technology Press Ltd, Surrey, UK.

* * *

Prof. A. Rahman, Acting Director, National Institute of Science, Technology and Development Studies, New Delhi, and Chief (Planning), CSIR, has been elected to the International

Scientific Council of International Centre of Methodology for Future and Development Studies (ICMFDS), University of Bucharest, Romania.

The main objective of ICMFDS is to stimulate and polarize the field research studies carried out within the World Future Studies Federation network and to contribute to the international dialogue centred on the future and development problems. □

PATENTS FILED

104/Del/81: A wave energy system/ hydrovibration to rectify air flow, K.K. Sanyal & S.K. Basu—CMERI, Durgapur.

117/Del/81: Multigas sampling device to study atmospheric pollution, V.L. Pampattiwar & H.J. Patil—NEERI, Nagpur.

123/Del/81: Production of ergotamine from ergotamine-rich ergot, Vishwapaul & S.N. Garg—CIMAP Regional Centre, Jammu.

538/Del/81: Process for the manufacture of improved medicinal pellets for use as subdermal implants for controlled release of drug in a human or animal, Satyawan Singh, J.P. Sarin, N.M. Khanna, & Nitya Nand—CDRI, Lucknow.

924/Del/80: Improvements in or relating to blackening of electroless nickel deposits, B.A. Shenoi, S. John, N.V. Shanmugham, K.N. Srinivasan, M. Selvem—CECRI, Karaikudi.

925/Del/80: A device for the measurement of ac resistivity of liquids, P. Kapur, D.S. Jain & M.V. Subba Rao—CEERI, Pilani.

290/Del/81: Process for the catalytic conversion of alkylaromatic hydrocarbons into *p*-xylenes, P. Ratnasamy, (Kum.) S.B. Kulkarni, B.S. Rao, A.N. Kotasthane, (Smt) A.J. Chandwadkar & S.J. Kulkarni—S.G. Hedge, NCL, Pune.

291/Del/81: Process for the preparation of a catalytic composite material, (Kum.) S.B. Kulkarni, P. Ratnasamy, V.P. Shiralkar, I. Balakrishnan & C.V. Kavedia—NCL, Pune.

341/Del/81: An improved process for the production of sponge iron, B.K. Mazumdar, J.M. Sanyal & B.N. Bose—CFRI, Dhanbad.

353/Del/81: An improved hot air generator fired by particulate fuels, M.M. Sen & T.K. Dey—CFRI, Dhanbad.

ANNOUNCEMENTS

Patents System: Seminar

The national seminar on Patents Systems which was to have been held in February 1981 [*CN*, 31 (1981), 24] is scheduled for 28-29 November 1981 at the Regional Research Laboratory, Hyderabad. The contact person for the seminar is Dr S. Raghavender Rao (convener, National Seminar on Patents System), Regional Research Laboratory, Hyderabad 500 009. □

Correction

With reference to the proposal for the setting up of an institute for microbial technology and genetic engineering published in *CN*, 31 (1981), 145, the expert committee will first go into the feasibility of the proposal, and on the basis of their report will be taken the decision to set up the institute. □

COUNCIL OF SCIENTIFIC & INDUSTRIAL RESEARCH

Advertisement No. 37/81

The Council is looking for a suitable person for appointment as Director of the Centre for Cellular and Molecular Biology (CCMB) at Hyderabad, a newly created CSIR laboratory which is intended to serve as one of the major national centres for research in frontier and multidisciplinary areas of modern biology. The centre is at present housed in the Regional Research Laboratory, Hyderabad, but its own buildings are expected to be ready for occupation in 1983. It provides excellent modern facilities for research. Apart from conducting research, it will also provide short-term training of staff from other institutions in specialized techniques and will interact with other institutions, doing basic or applied work in related fields. Four independent research groups, each led by a person with high scientific reputation, already exist with adequate number of research staff and technique-oriented supportive groups. It is proposed to attract other outstanding scientists to this institute and build groups around them.

The Director of CCBM will be responsi directing the growth of the laboratory fr stage in which it is at present to full streng for ensuring the maintenance of a high l excellence. He should be a person of p scientific stature and managerial capabili attract outstanding talent to the institution

Qualifications: The Director is expected t high qualifications in any branch of m science with extensive research experience i area of modern biology.

Age: Preferably below 50 years but ca relaxed.

Scale: Rs 2500-125/2-3000 plus allowanc Central Government rates. Higher start ca be considered.

This is a contractual appointment initially period of six years, but the contract is exten and the person can also be confirmed.

There is a prescribed form for sending *curriculum vitae* and those interested may o this from the Chief (Administration), Coun Scientific and Industrial Research, Rafi M New Delhi 110 001. However, the *curriculum* can be sent without the prescribed form also. last date of receipt of the *curriculum vitae* December 1981.

Nominations are also invited from establi scientists and heads of institutions in the cou for this position.

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The Council proposes to appoint a Scientist F will be in charge of its Scientific & Techn Manpower Division at New Delhi. His sponsibilities include: maintenance of National Register of Scientific & Techn Personnel at home and abroad, and information on scientific/technical experts personnel in different fields, and to match ta with tasks; the setting up of a technol manpower bank; manpower research and sur utilization of scientific and technical person operation of Scientists' Pool; and other rela duties.

He should have high academic qualification science/technology and sound knowledge experience and understanding of the problem scientific and technical manpower of the coun Experience in information storage and retri systems will be an added advantage.

The scale of pay is Rs 2000-125/2-2500 p allowances at the Central Government ra Higher start may be given. Age limit is 50 ye relaxable in deserving cases. Initial appointm will be on contract for six years with a period probation of two years. The contract is renewa and the incumbent can also be confirmed.

Applicants may send their *curriculum vitae* copies) in the standard proforma which can obtained from the Chief (Administration), CS Rafi Marg, New Delhi 110 001. Completed for must be sent so as to reach the office on or bef 26 November 1981.

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